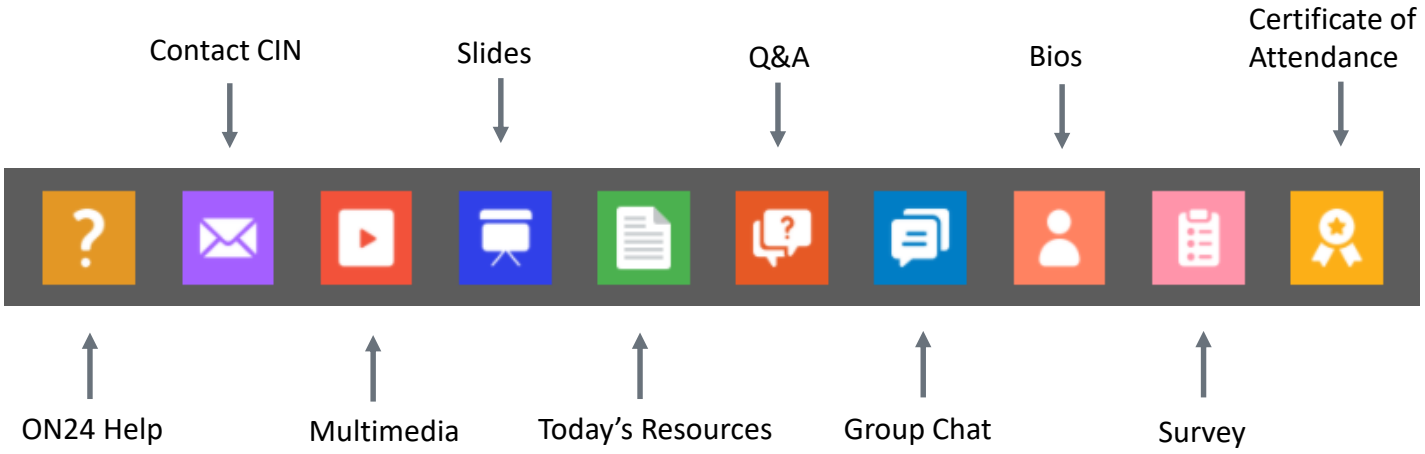
CompTIA Network+ N10-009 TTT Session 3:

Title

June 27, 2024

CompTIA

@TeachCompTIA #NetworkPlusTTT



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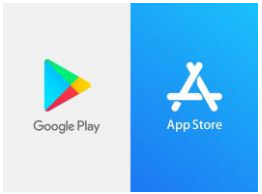
CompTIA INSTRUCTOR NETWORK

The CompTIA Instructor Network (CIN) is a worldwide community for instructors who provide CompTIA certification training.

Benefits of being a community member include:

- Communicate and collaborate with CompTIA staff and other instructors.
- Access resources for students to understand the value of getting certified.
- Receive complimentary training and tools from CompTIA to enrich your classroom.
- Become proficient at teaching CompTIA standards.
- Share best practices and resources with each other.



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PARTNERSUMMIT 24

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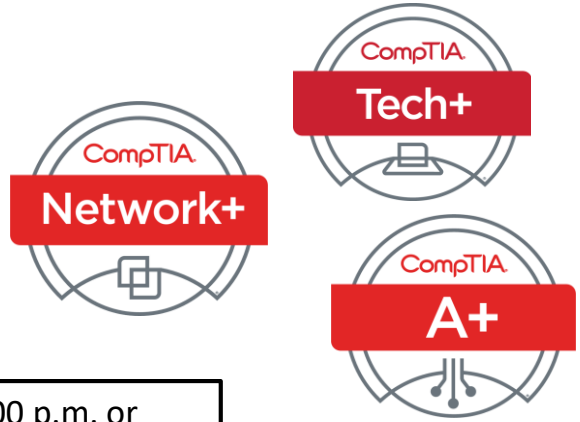
SYNC IN

CIN CompTIA INSTRUCTOR NETWORK

TRAIN THE TRAINER

WORKSHOPS



Join us for the morning session from 9:00 a.m. to 12:00 p.m. or
the afternoon session from 1:00 p.m. to 4:00 p.m.
Each session is $99.00.
Lunch and refreshments provided

Workshop sessions:

1. Get In Sync with the new CompTIA Tech+ FC0-U71
2. Teaching CompTIA Network+ N10-009 with the new CertMaster Perform
3. Tools for teaching CompTIA A+ 1100 Series

Each session provides:

- Access to official CompTIA content for the course
- Instructor led training and labs
- Certificate of completion provided at the end of session.

Hyatt Regency Atlanta
July 31 – August 1
Register today: https://connect.comptia.org/partnersummit/home

Network+ N10-009 TTT Session Outline	
Date	Topic
✓ 06/20/2024	Introduction and Network Topologies
✓ 06/25/2024	Cabling and Physical Installations
✓ 06/27/2024	Configuring Interfaces and Switches
07/02/2024	Configuring Network Addressing
07/09/2024	Configuring Routing and Advanced Switching
07/11/2024	Network Security
07/16/2024	Network Security (Continued)
07/18/2024	Wireless Networking
07/23/2024	Troubleshooting and Management
07/25/2024	Emerging Technologies and Trends

CONFIGURING INTERFACES AND SWITCHES

LEARNING OBJECTIVES

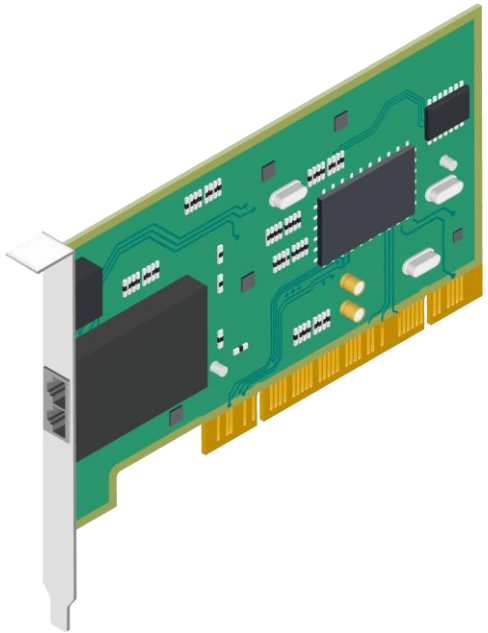
DEPLOY NETWORKING DEVICES
EXPLAIN NETWORK INTERFACES
DEPLOY COMMON ETHERNET SWITCHING FEATURES
TROUBLESHOOT TRANSCEIVER SWITCHING ISSUES

Think About It: Network Interfaces

- What is a network interface?

Network Interface Cards

- A network interface card (NIC):
  - Transceiver component
  - Connects the host to a transmission medium (wired or wireless)
  - Can have multiple ports on same card
  - Has a unique MAC address
  - Operates at the Data Link layer



Symptoms of NIC Issues

Common symptoms of NIC issues include:

- Network connectivity failure
- Slow network speeds
- Intermittent connectivity
- Device manager error messages
- Network setting error messages

Modular Transceivers

- Modular transceivers
  - Terminate multiple types of cable and connector types
  - Operate at the Data Link layer

Symptoms of Transceiver Issues

Mismatched ports

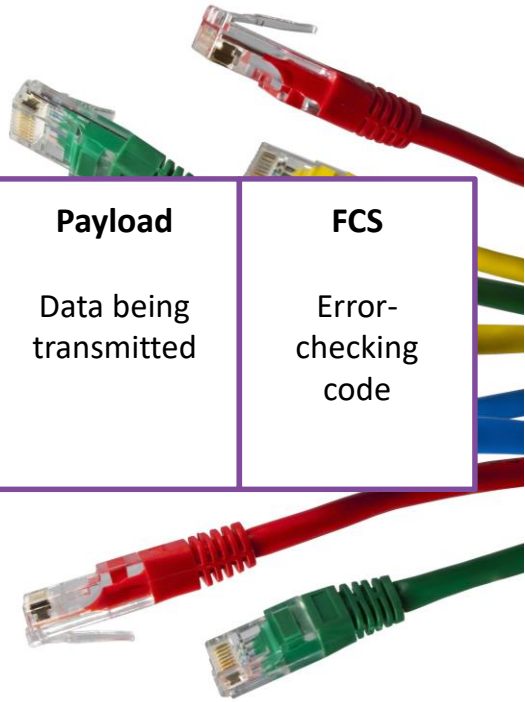
- No link
- Intermittent connection loss

Signal strength

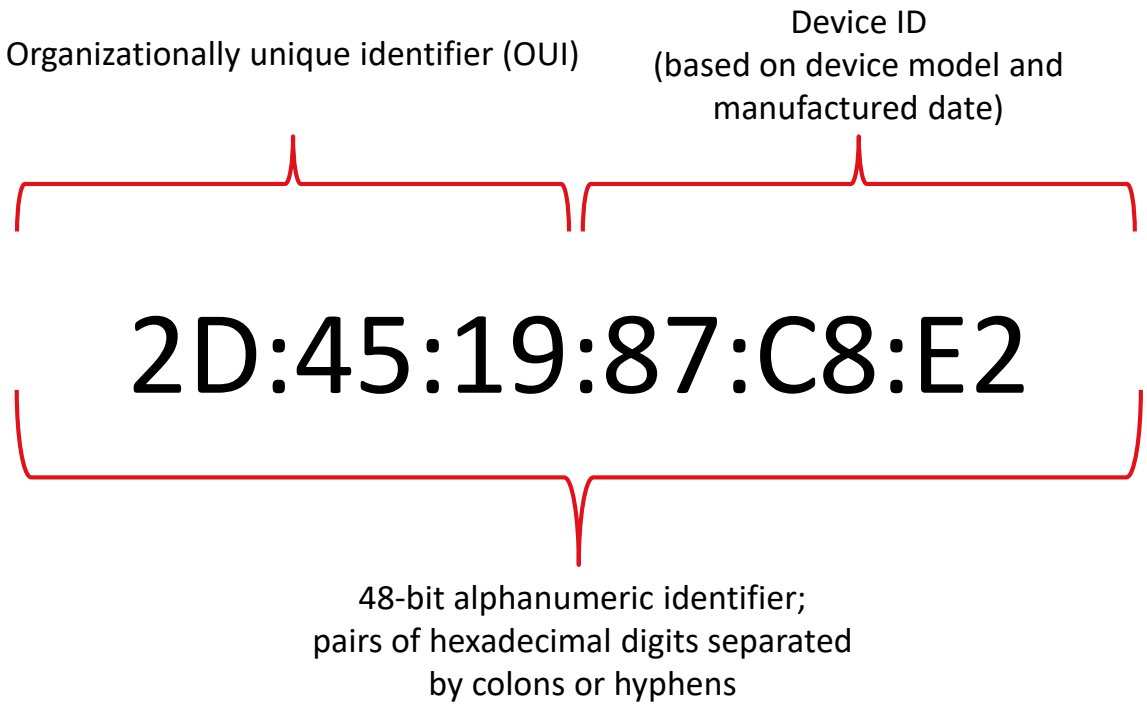
- Intermittent connections
- Packet loss
- Poor network performance

Ethernet Frame Format

Preamble	SFD	Destination MAC	Source MAC	Ether Type	Payload	FCS
Synchronization sequence	Signals the start of the frame	Address of the recipient device	Address of the sending device	Protocol of the payload	Data being transmitted	Error-checking code



MAC Address Format



MAC Broadcast Address

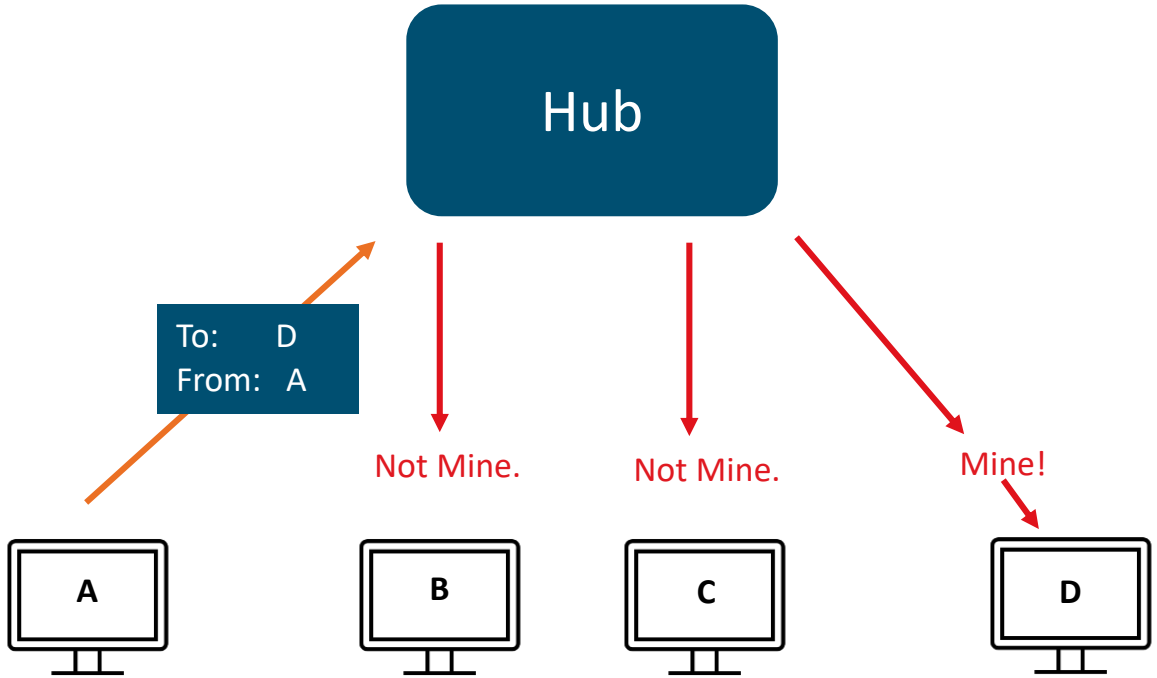
Preamble	SFD	Destination MAC	Source MAC	Ether Type	Payload	FCS
Synchronization sequence	Signals the start of the frame	Address of the recipient device	Address of the sending device	Protocol of the payload	Data being transmitted	Error-checking code

Broadcast Address
11:11:11:11:11:11

If MAC address is all 1s, all hosts on that network will receive and process the packet

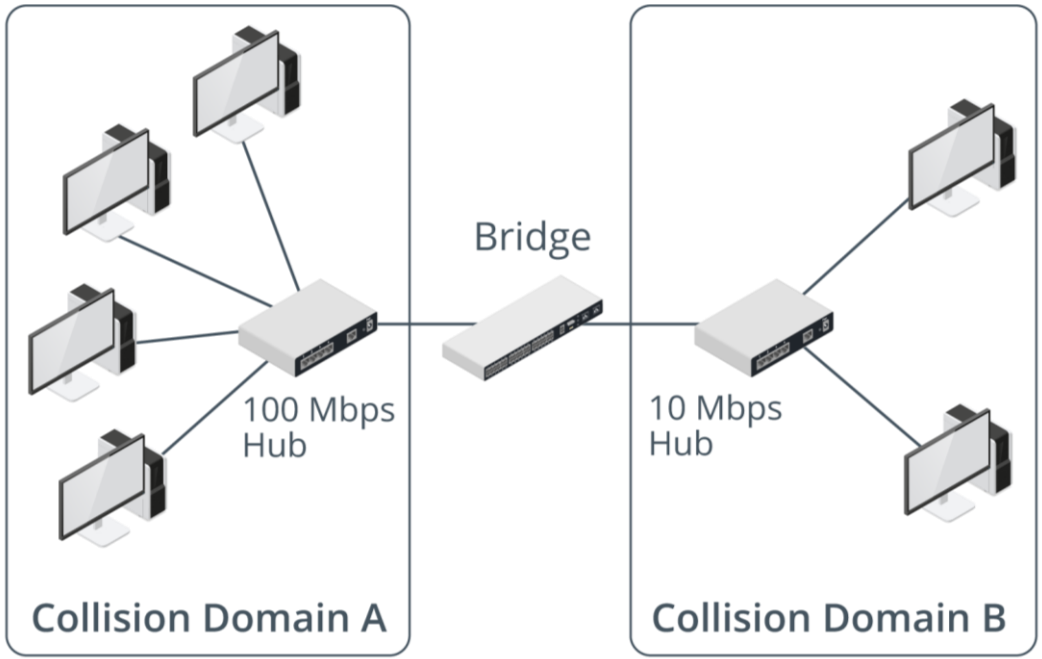
ETHERNET SWITCHES

Hubs



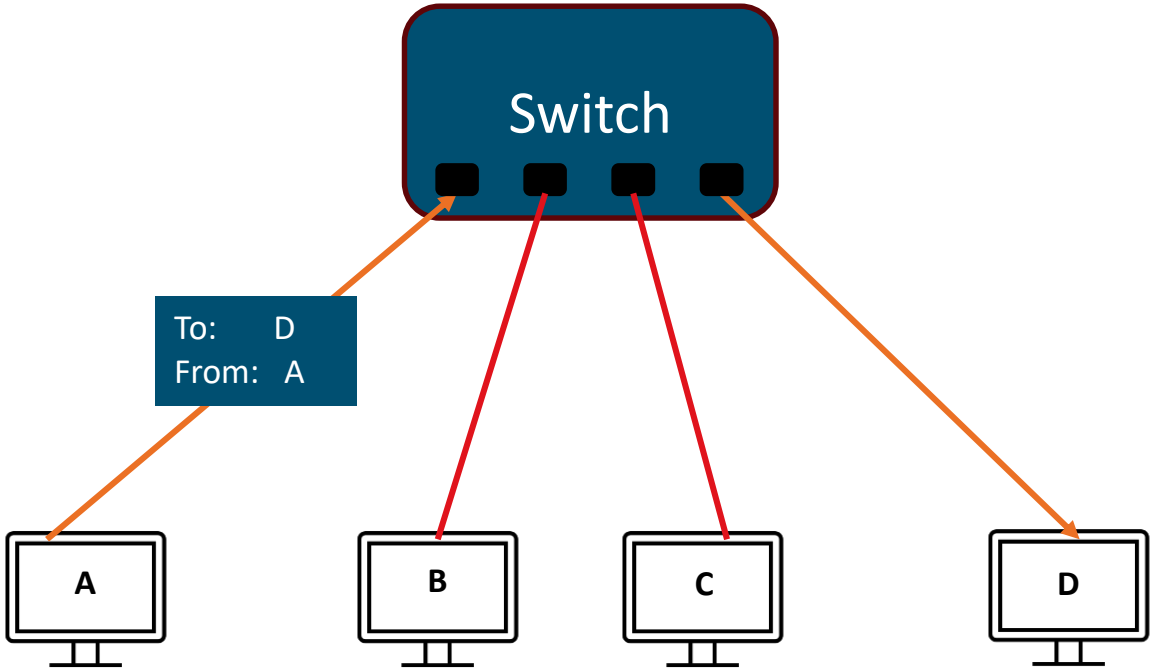
Hubs send transmissions from one port to every other port.

Bridges



Bridges separate physical network segments while keeping all nodes in the same logical network.

Switches



A switch sends transmissions from one port only to the destination port.

Ethernet Switch Types

Unmanaged vs. Managed

- Managed switches can be configured
- Unmanaged switches have no configuration options

Modular vs. Fixed

- Modular can be configured with different numbers and types of ports
- Fixed come with a set number of ports

Desktop vs. Rack

- Desktop switches are free standing
- Rack-mounted switches are designed fit into networking racks

Stackable

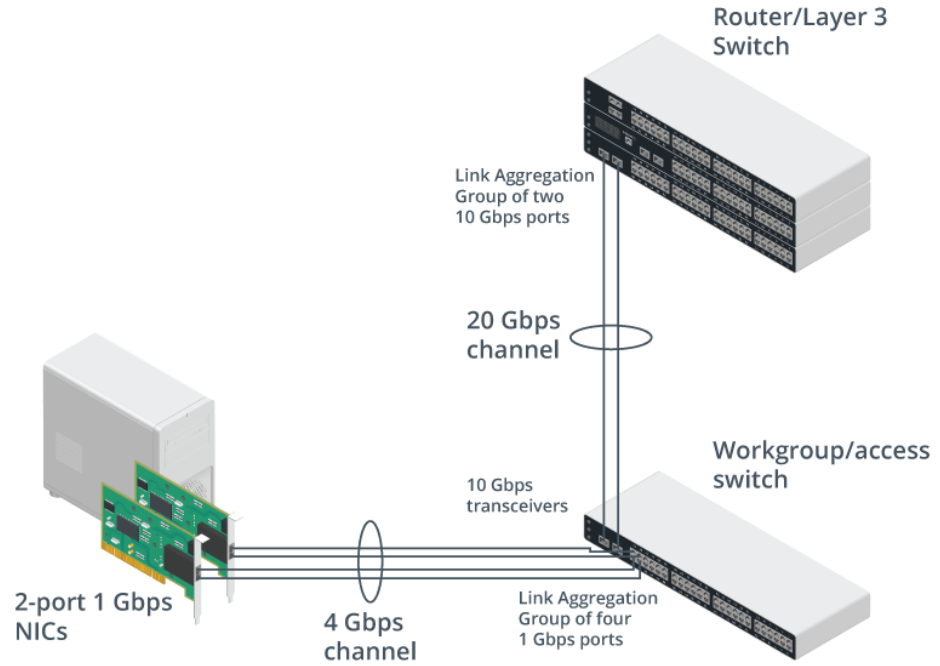
- Can be connected together
- Can be managed as a single unit

SWITCH PORT CONFIGURATION

Link Aggregation/NIC Teaming

Link aggregation

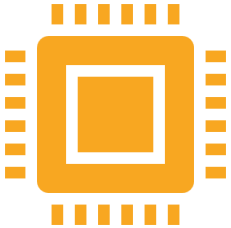
- Combining 2+ separate cabled links into a single logical channel
- Provides redundancy
- Cost effective



Maximum Transmission Unit

Standard ethernet frame

Maximum transmission unit (MTU) is 1,500 bytes



Jumbo frame

Supports payload up to 9.216 bytes

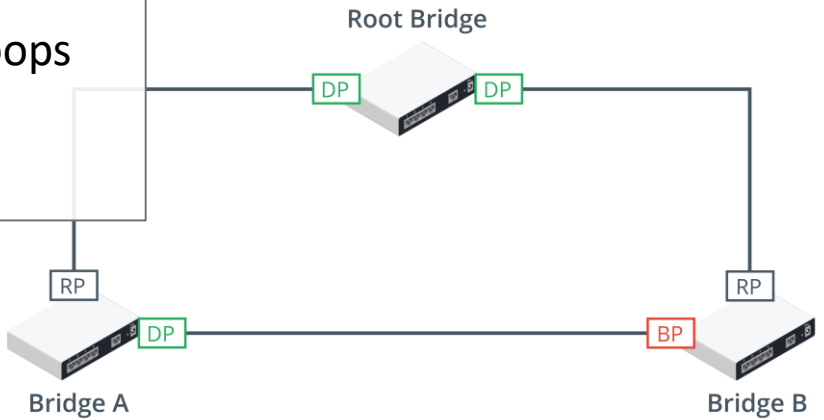
Reduces the number of frames transmitted

Limited because they break Ethernet standards

Spanning Tree Protocol

Spanning Tree Protocol (STP)

- Layer 2 protocol
- Prevents bridge loops
- Provides fault tolerance



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Power Over Ethernet

Power over Ethernet (PoE)

- Allows 1 cable to transmit both data and power to networked devices
- Simplifies network installation and expansion

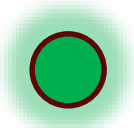
LAB TIME | CONFIGURE A POE SWITCH

SWITCH TROUBLESHOOTING

Hardware Failure Issues

Hardware Failure Issue	Troubleshooting and Mitigation Steps
Power issues	• Verify stable power supply • Install UPS and secondary power sources
Network adapters	• Check for damaged ports or connectors • Test with alternative adapter if possible • Update or reinstall drivers
Switches/routers/modems	• Visually inspect for damage • Inspect indicator lights • Verify power supply and cabling connections • Restart the device following proper protocols
Overheating	• Check for proper ventilation around the device • Clean dust from intake or exhaust vents • Ensure cooling systems are operational

Port Status Indicators

	Solid green	The link is connected, but there is no traffic
	Flickering green	The link is operating normally (with traffic). The blink rate indicates the link speed
	No light	The link is not working, or the port is shut down
	Solid amber	The port is blocked by the spanning tree algorithm
	Blinking amber	A fault has been detected

Switch Show Commands

Show config	• Device's current configuration
Show startup-config	• Configuration device will use upon the next restart
Show running-config	• Active configuration currently used by the device
Show interface	• Detailed information about the device's network interfaces

Switch Show Command Status

Down/down	Both the layer 1 (physical) and layer 2 (data link) connections are inactive.
Administratively down/down	The interface has been manually disabled by an administrator using the **shutdown** command
Down/error disabled	The interface has been automatically disabled due to a network error or policy violation
Up/down (suspended)	The physical layer is operational, but the data link layer is inactive due to administrative settings or errors

Interface Error Counters

Link state

- Checks if interface is up or down
- Immediate alert for downtime

Resets

- Count of manual and automatic restarts
- High frequency of resets should be monitored

Discards/drops

- Causes by checksum errors, mismatched MTUs, size anomalies, high load, ACL or VLAN configuration errors
- Used for troubleshooting

Common Interface Errors

•Cyclic Redundancy Check (CRC) Errors

- •Frame's calculated checksum does not match the transmitted checksum
- •Indicative of noise, interference, or equipment malfunctions

•Runt Frame Errors

- •Frames are smaller than the minimum frame size.
- •Results from collisions or damaged hardware.

•Giant Frame Errors

- •Frames exceed the maximum allowed size.
- •Caused by misconfiguration or malfunctioning network devices

Network Loop and Broadcast Storm

Network Loops: Causes	Network Loops: Solutions	Broadcast Storms: Causes	Broadcast Storms: Solutions
• Redundant connections • End-device side	• Proper redundant connection configuration • Implement spanning tree protocol (STP) • Educate users	• DHCP issues • Very large broadcast domains	• Monitor DHCP traffic • Segment the network

Discussion

How does the Spanning Tree Protocol prevent network loops?

Describe the process of configuring a network switch.

Activity: What Would You Do?

The switch won’t power on.

What troubleshooting steps would you take?

Summary

- **NIC vs. Transceiver**: NIC connects host to network (cable), transceiver adapts cable types
- **Hub vs. Switch**: Hub broadcasts to all devices, switch directs traffic to specific devices; bridge connects networks, keeps them logically unified
- **STP**: Prevents bridge loops and ensures network redundancy (Layer 2 protocol)

Discussion time: Please type your questions in chat

- Questions over content.
- Share you experience.
- What would you like to see different moving forward?

Let’s keep the conversation going in the CompTIA Instructor Forum: https://cin.comptia.org